

**GOOD INTENTIONS OR GOOD
TARGETS? NBC DEFENSE
CONSIDERATIONS DURING PEACE
OPERATIONS**

**A MONOGRAPH
BY
Major Scott D. Kimmell
Chemical**

**School of Advanced Military Studies
United States Army Command and General Staff
College
Fort Leavenworth, Kansas**

First Term AY 98-99

Approved for Public Release Distribution is Unlimited

19990804061

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. AGENCY USE ONLY (Leave blank)

2. REPORT DATE

17 December 1998

3. REPORT TYPE AND DATES COVERED

Monograph

4. TITLE AND SUBTITLE

GOOD INTENTIONS OR GOOD TARGETS: NBC DEFENSE
CONSIDERATIONS DURING PEACE OPERATIONS

5. FUNDING NUMBERS

6. AUTHOR(S)

SCOTT D. KIMMEL

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

School of Advanced Military Studies
Command and General Staff College
Fort Leavenworth, Kansas 66027

8. PERFORMING ORGANIZATION
REPORT NUMBER

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)

Command and General Staff College
Fort Leavenworth, Kansas 66027

10. SPONSORING / MONITORING
AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION / AVAILABILITY STATEMENT

APPROVED FOR PUBLIC RELEASE
DISTRIBUTION UNLIMITED.

12b. DISTRIBUTION CODE

13. ABSTRACT (Maximum 200 words)

SEE ATTACHED

14. SUBJECT TERMS

15. NUMBER OF PAGES

52

16. PRICE CODE

17. SECURITY CLASSIFICATION
OF REPORT

UNCLASSIFIED

18. SECURITY CLASSIFICATION OF THIS
PAGE

UNCLASSIFIED

19. SECURITY CLASSIFICATION
OF ABSTRACT

UNCLASSIFIED

20. LIMITATION OF ABSTRACT

UNLIMITED

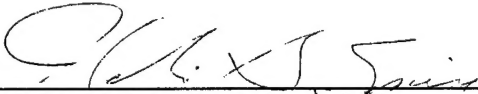
SCHOOL OF ADVANCED MILITARY STUDIES

MONOGRAPH APPROVAL

Major Scott D. Kimmell

Title of Monograph: *Good Intentions or Good Targets? NBC Defense Considerations
During Peace Operations*

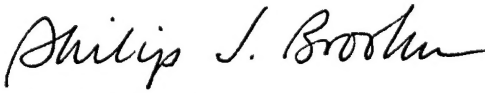
Approved by:



LTCOL Melvin G. Spiese, MS Monograph Director



LTC Robin P. Swan, MMAS Director, School of Advanced
Military Studies



Philip J. Brookes, Ph.D. Director, Graduate Degree
Program

Accepted this 16th Day of December 1998

ABSTRACT

GOOD INTENTIONS OR GOOD TARGETS? NBC DEFENSE CONSIDERATIONS DURING PEACE OPERATIONS by MAJ Scott D. Kimmell, USA, 41 pages.

As recent history illustrates, future maintenance of world order and stability will require peace operations on a rather regular basis. The United States, reigning world superpower, will probably absorb its fair share of these missions. However, nations, sub-national groups or terrorist organizations hostile to the United States or its interests may attempt to fuel instability or stop a peace process. Employment of an asymmetrical threat such as weapons of mass destruction would certainly impede a peace operation. This monograph examines the unique missions of peacekeeping and peace enforcement and assesses whether or not current United States nuclear, biological and chemical (NBC) defense doctrine is applicable in peace operations.

The monograph begins by documenting the relevant facts of the history of weapons of mass destruction (WMD), identifying the threat and examining possible relationships to peace operations. Although the employment of WMD during peace operations has not yet been confirmed, its potential use under these conditions should be seriously considered. Therefore, the monograph examined two case studies in which the potential for WMD employment was a possibility. The case studies include an overview of each operation, an analysis of the relevant WMD threat, and an identification of likely NBC defense requirements for a peace operation conducted in a NBC environment.

Lastly, NBC defense doctrine is analyzed using the requirements identified in the case studies. The doctrinal functions of avoid, protect and restore were evaluated as to their applicability in peace operations. Specifically, does the doctrine satisfy the requirements of the tactical commander? The analysis identified a shortfall in NBC defense support to refugees and civilians involved in peace operations. The monograph closes with recommendations for mitigating the shortfall.

TABLE OF CONTENTS

	Page
I. Introduction.....	1
II. Defining the Topic.....	4
History of Chemical Warfare.....	4
The Threat.....	8
Peace Operations.....	11
III. NBC Defense and Obscuration Doctrine.....	16
IV. Case Studies.....	19
Operation Provide Comfort.....	20
Operation Joint Endeavor.....	26
V. Analysis of NBC Defense Doctrine.....	32
Evaluation Criteria.....	32
Doctrine Analysis.....	33
VI. Conclusion.....	39
Endnotes.....	41
Bibliography.....	46

Introduction

General Pershing declared at the close of the World War I (WWI), "Whether or not gas will be employed in future wars is a matter of conjecture, but the effect is so deadly to the unprepared that we can never afford to neglect the question."¹ Chemical weapon use can be traced back to the Peloponnesian War in 5th century B.C. when the Athenians and Spartans used sulfur fumes when conducting sieges on fortified cities.² In 673 A.D. the Emperor Constantine Pogonatus used a form of napalm when the Sarcens besieged Constantinople. Over 500 years later the Moslems used a similar weapon against the Christians in 1190 during the siege of Acre.³ As early as 1762 the Germans employed asphyxiating gas during a siege of the Austrian held Silesian fortress of Schweidnitz.⁴

WWI marked the height of chemical weapons use as belligerents attempted to break the stalemate caused by the dramatic changes in land warfare. Since WWI the use of weapons of mass destruction (WMD) has been intermittent. Italy used chemical weapons in their war with Ethiopia, and Japan in their war with China. In WWII the Germans used poisonous gases in their concentration camps and stockpiled enormous amounts of chemical agents. However, except for the United States employment of atomic weapons in Japan, WMD were not used in WWII. After WWII Egypt used chemical weapons during the civil war in Yemen (1963-1967). The Iran-Iraq War marked the most widespread use of chemical weapons since WWI, to include attacks against Kurdish civilians in Northern Iraq.

However, the most recent military employment of weapons of mass destruction allegedly occurred in 1993 in Bosnia where Muslim forces employed chlorine filled

mortar shells against Bosnian Serb forces near Boskovici.⁵ Although there is no evidence that the chemical attacks had any impact on the outcome of the fighting, the fact that chemical weapons were allegedly used is significant. First, it illustrated Bosnian Muslim capability to employ WMD, specifically chemical weapons. Second, it highlighted the need for nuclear, biological, and chemical (NBC) defense measures for the United Nations force conducting peace operations in the vicinity.

The May 1997 National Security Strategy for a New Century (NSS) establishes the United States intent with regard to peace operations. The NSS recognizes peace operations as an integral method for achieving international security. It describes these operations as part of the family of small-scale contingency operations to "vindicate national interests."⁶ These operations will likely pose the most frequent challenge for United States forces and require significant commitments over time. While the Army's focus is on warfighting, one of its missions is to provide the nation a means to protect and achieve national security interests in the changing international security environment. Recent history indicates that peace operations will occur more frequently in the future. The nation's involvement in peace operations is illustrated by participation in recent peace operations in Northern Iraq, Bosnia-Herzegovina, Somalia, and Haiti.

The United States military participates in peace operations ranging from peace enforcement to humanitarian relief. These operations place military forces in some treacherous areas such as Southwest Asia and the Balkans. Nations or parties hostile to the United States or its interests in these operations may use WMD to interfere with or prevent the attainment of national objectives. Several nations are known or suspected to maintain offensive chemical weapons programs. These nations have not signed/ratified

the Chemical or Biological Warfare Convention and are located in proximity to areas in which the United States has conducted peace operations. These nations include Egypt, Iraq, Libya, North Korea, Serbia/Montenegro and Syria. Another threat to United States military forces and citizens comes from non-state players, terrorist groups and fringe organizations intent on disrupting United States efforts in achieving interests. The technology to produce lethal chemical weapons is well known and widely available. Sponsorship from a rogue nation can facilitate terrorist development of both chemical and biological agents. Employment of WMD can occur throughout the spectrum of possible United States military missions, including peace operations.

The commitment of the military in peace operations requires consideration of all capabilities. Versatile application of these capabilities requires the development of peace operation task forces best suited to achieve the required end-state. The employment of weapons of mass destruction in the presence of United States military forces conducting peace operations appears to be possible. WMD and NBC hazard scenarios facing United States forces include threat of use, collateral contamination, industrial hazards, and deliberate targeting of stability forces to impede the peace process. Introduction of such hazards and weapons by warring parties, non-state players or terrorist groups in the presence of United States forces make force protection and survivability measures imperative. An effective NBC defense program, including the use of NBC defense assets during peace operations, protects the force and increases the unit's ability to achieve its mission under NBC conditions. The research question of this monograph explored the unique missions of peacekeeping and peace enforcement and assessed whether or not current United States NBC defense doctrine was applicable in peace operations. Two

historical examples of peacekeeping and peace enforcement operations serve as the test environments or experiments (Operation Provide Comfort-Northern Iraq and Operation Joint Endeavor-Bosnia). Where shortfalls exist, recommendations are provided.

Defining the Topic

History of Chemical Warfare

The use of chemical weapons in conflict ranges from 2000 B.C., when toxic fumes were employed in India, to the most recent alleged use in 1993 during the civil war in Bosnia-Herzegovina. The history of warfare is laden with man's willingness to employ WMD. Specific events in history distinctively exemplify the evolution of WMD employment from its genesis to the present. Although not inclusive, these events highlight significant turning points in the development and employment of WMD.

World War I witnessed several occurrences that would forever change the conduct of war. However, the first successful use of poison gas by the Germans at Ypres, on April 22, 1915, was unprecedented. Ypres marked the first time in WWI that men in battle witnessed the physical effects of poison gas warfare. The frightful effects of "gassing" included blindness, burned internal organs and, in some, death.⁷ Although the use of gas was labeled as barbaric, inhumane, and feared by soldiers more than any other weapon on the battlefield, it was less lethal than all the other weapons.⁸ Of the estimated 1.2 million gas casualties in the war death only accounted for 7%.⁹ However, the effects of chemical weapons in the war were significant for two reasons. First, a single gas attack could literally cripple medical support systems by its production of large numbers of casualties at one time. Second, no other weapons in the war had a greater psychological impact on the individual soldier and country than did the use of chemical

weapons. A fact that the American Expeditionary Force unnecessarily experienced.

General Pershing's well-known quote best captured the American military experience with respect to chemical warfare. Despite chemical weapons use in Europe the United States failed to develop and implement a pre-war training program and logistical support mechanism that provided adequate force protection measures for American soldiers. Although gas warfare had been used extensively, United States preparation started in earnest only after entering the war. Failure to understand and fully realize the implications of a chemically developed theater of war caused the American Expeditionary Force to suffer unnecessary casualties.

Proliferation of chemical weapons in WWI significantly and permanently altered the face of the tactical battle. Although not singularly decisive, the employment of chemical weapons served to deny terrain, harass the enemy, increase attrition, decrease morale and reduce combat power. Once chemical weapons were introduced, armies quickly attempted to adapt and minimize their effectiveness. However, when chemical warfare was used against unprotected or unprepared troops, large numbers of casualties resulted.¹⁰

The use of chemical weapons in WWI validated that the world possessed the resolve, will and conscience to employ weapons of mass destruction. The effective use of chemical weapons at Ypres in 1915 marked a significant turning point in the evolution of warfare. From this point forward nations engaging in conflict at any level would be forced to consider the existence of weapons of mass destruction as a possible condition on the battlefield and in future confrontations.

Between WWI and WWII chemical weapons were used extensively by the

Italians and Japanese on both combatants and civilians. The extent of employment never approached the magnitude of employment in WWI.¹¹ However, the inter-war years witnessed the arrival of a new methodology for employing chemical warfare, the targeting of civilian populations.

In complete contrast to WWI, WWII was fought on a chemical free battlefield. Although one would like to believe that legal and moral issues removed this horrific weapon from the war, the fear of retaliation most likely forced its absence. Germany and Britain believed that the introduction of chemical warfare would cause retaliation, specifically against civilian populations.¹²

The United States contemplated using gas several times in the Pacific Theater. However, President Roosevelt's moral non-use declaration, combined with the fear of retaliation in the Europe, prevented its introduction in the Pacific.¹³ The Pacific Theater, although void of chemical weapons, hosted the employment of another horrific weapon of mass destruction, the atomic bomb.

Between WWII and the United States engagement in Vietnam the use of chemical weapons continued. Egypt employed chemical weapons in the Yemeni civil war, 1963 to 1967. Mustard and phosgene aerial bombs killed an estimated 1,400 people. Libya, known to possess chemical weapons for many years, allegedly used them against Chad.¹⁴

The Iran-Iraq War (1983 to 1988) produced the most prolific use of chemical weapons since World War I. Both belligerents used chemical weapons extensively. However, Iraqi employment proved to be the most effective and the most deadly.

The most egregious use of chemical weapons in the Iran-Iraq War occurred, as it has in recent history, against civilians. In its actions in Iraqi Kurdistan, Iraq unknowingly

provided substantial justification for the Chemical Weapons Convention.¹⁵ On March 17, 1988, Iraq attacked the Kurdish village of Halabja with a variety of chemical weapons, including cyanide gas and suspected nerve agents, against the civilian population killing hundreds of refugees. The press' detailed description of the attack, to include graphic pictures of victims, caused worldwide disdain and demand for the elimination of chemical weapons.¹⁶

Iraq's use of chemical weapons in the Iran-Iraq War validated world concerns that Iraq had developed a substantial chemical warfare capability and, more importantly, was willing to use it. Iraq's invasion of Kuwait in 1990 coupled with the requirement for United States response focused serious attention on the probability of soldiers fighting in an NBC environment.

At the outset of the crisis defensive capabilities of both United States and coalition forces were considered to be low. Extensive measures were taken to improve NBC defense capabilities of all coalition forces prior to the initiation of Operation Desert Storm. Improvements in material and the initiation of an intensive training program prepared coalition forces to fight and win on a chemically contaminated battlefield.¹⁷

Although Iraq possessed the capability and experience to use chemical weapons, they were not deliberately employed in Operation Desert Storm. United States and coalition actions, strategically, operationally and tactically, probably had a considerable impact. More importantly, leaders and troops through extensive training and preparation were confident that they could sustain combat operations in a chemical environment.¹⁸

The history of warfare is replete with examples of man's willingness to employ weapons of mass destruction. From the early employment of crude forms of chemical

weapons in the Peloponnesian War to Saddam Hussein's chemical attacks against the Kurds in 1988, nuclear, biological, and chemical weapons remain a serious concern. The question that political and military leaders must always ask is not whether WMD will be used but, by whom and how? The answer to these questions will prepare a nation and its fighting men and women to fight, survive and win its wars and protect its interests.

The Threat

In an interview conducted by *Jane's Defence Weekly*, Defense Secretary William Cohen said that the United States has "such overwhelming power that other countries now will, in fact, turn to the asymmetrical types of threats."¹⁹ Specifically, nations or special interest groups (non-state/sub-national groups) threatening American interests will likely attempt to cripple military forces through unconventional means via chemical or biological warfare.

The potential that the United States will likely face an asymmetric threat is the elementary portion of the analysis. Weapons of mass destruction are rather easy to acquire. A wide range of people with an even wider range of motives have the capability to acquire these weapons. Possession of even crude forms of WMD gives third world countries and terrorist organizations significant power. The possibility, or even likelihood, of WMD being used on what we regard as completely irrational grounds creates a serious problem when attempting to construct an adequate threat analysis and predictability.²⁰

Understanding the threat exists and the methods in which WMD may be employed provide the impetus for preparedness. Knowing in which direction to look is a complex portion of this equation. Nations known to be principal chemical threat

proliferators are Iraq, Iran, Libya, Syria and North Korea. These nations, minus North Korea, pose a very different threat than that posed by the former Soviet Union. Specifically, chemical weapons could be used by these countries or groups they sponsor to attack the popularly perceived American center of gravity-public opinion.²¹

An additional WMD threat exists in the form of non-state actors and terrorist organizations. The use of Sarin gas by the Aum Shinrikyo in Japan turned possibility into reality. Although the threat of similar incidents occurring remains low according to United States intelligent sources, the development of biological or chemical weapons requires less effort and resources than one would like to believe. WMD could be used by terrorists or like organizations to gain public notice and instill fear.²² The proliferation and ease to obtain WMD poses a grave threat now, more than ever before. Recent verified cases involving chemical weapon employment determined that chemical weapons were used to terrorize and intimidate the adversary. Whether employed by a rogue nation or non-state player, the potential for WMD use is growing.²³

The challenges posed by the proliferation of WMD are many. Intelligence requirements must be reconsidered and assets must be tailored in order to meet the operational and tactical needs of the services. With proliferation occurring in regions where the United States must protect its vital interests, developing a viable NBC defense strategy is an essential task. In addition, employment concepts and methodologies of potential regional adversaries are likely to be much different than those of adversaries of the past.²⁴

The May 1997 Quadrennial Defense Review outlined that defense planners must assume the use of WMD as a 'likely' condition in future warfare to be used early in a

conflict to disrupt United States operations and logistics.²⁵ However, this broad-brush approach to threat analysis fails to address how an enemy might employ WMD across the spectrum of conflict. Service doctrine is no different. For example, doctrine fails to address how an enemy might employ WMD against United States forces conducting peace operations. The National Security Strategy states that these operations are necessary yet United States doctrine fails to identify threat employment methods.²⁶ Therefore, to counter the potential threat with a viable NBC defense strategy that promotes mission success, employment methods must be identified with regard to peace operations.

The identification of potential WMD targets during peace operations provides a technique for analysis of threat employment doctrine. Three general areas or methods appear to establish the foundation for WMD employment. First, warring factions may choose to use chemical or biological weapons against each other similar to the Iran-Iraq conflict. Second, civilians could be targeted to achieve a political advantage or as an act of retribution. Iraqi chemical attacks against Kurdish civilians in 1988 confirm this method. Finally, peace operation forces could be targeted to disrupt a potential peace process or to generate regionally instability.

With proliferation occurring in areas of regional conflict, the opportunity use of WMD to disrupt regional stability is becoming more likely. Deployments to these regions of conflict present a new and serious concern.²⁷ United States military forces may be required to conduct peace operations in an NBC environment. Unlike combat operations conducted on a chemically contaminated battlefield, peace operations may involve additional requirements with respect to NBC defense.

Peace Operations

In May 1994 the Clinton administration's policy on Reforming Multinational Peace Operations stated, 'Properly constituted, peace operations can be one useful tool to advance American national interests and pursue our national security objectives.'²⁸ This brief statement formulated national policy concerning United States involvement in peace operations globally and launched the dawning of a new era in military employment.

Peace operations worldwide are growing exponentially. In the United Nations' first 40 years it conducted 13 peace operations. Since 1988, the number of peace operations has more than doubled and become increasingly complex. The United States Army is no stranger to peace operations, participating in the UN Truce Supervisory Organization (1948), Lebanon (1958), the Dominican Republic (1965), and the Sinai (since 1982). However, since 1948, the pace, scope, number and complexity of recent operations changed dramatically. On any given day United States troops conduct or support peace operations worldwide such as food distribution in Somalia, security patrols in Haiti, or facilitating elections in Bosnia.²⁹

Peace operations and stability and support operations (SASO) come in many different forms, shapes and sizes. A universally agreed upon term for them is almost as difficult as their conduct. However, peace operations as defined in FM 100-23, *Peace Operations*, are those activities that create and sustain the conditions necessary for peace to flourish.³⁰ According to Joint Pub 3-07, Joint Doctrine for Military Operations Other than War (MOOTW), MOOTW involves a 'wide range of challenging operations' and one that the armed forces need to be prepared to participate. A statement echoed by the Army.

Defining success in these operations and identifying a concrete end-state is difficult. Commanders judge success based on the achievement of specific tactical missions which support the political leaders' goals. There are no quick fixes. However, a necessary condition for successful peace operations is the professional execution of the military component.³¹ It is the military that has the ability to establish the proper conditions and facilitate diplomatic solutions to these complex problems.

The collapse of the former Soviet Union in 1991 re-energized and even catalyzed numerous long submerged local and regional conflicts. Of particular note is the re-emergence of ethnic conflict in the Balkans. The United States, and particularly military attention, focused on the ethnic violence that threatened stability in the region. This instability shifted United States Army Europe focus from central Europe to individual regions, specifically the Balkans.

For example, in December 1995, United States forces crossed the Sava River with 20,000 soldiers to implement the Dayton Peace Accords in support of Operation Joint Endeavor. Today, in conjunction with the earlier actions of the United Nations Protection Force (UNPROFOR), people of Bosnia and Herzegovina are alive due to these efforts to stop the fighting. In Operation Able Sentry, a mechanized infantry company in support of the UN Preventive Deployment Force monitors and reports activity along the Former Yugoslav Republic of Macedonia (FYROM)/Serbia border area which could undermine confidence and stability in the FYROM. Lastly, soldiers from Europe supported Operation Provide Comfort in Northern Iraq in support of Kurds threatened by Iraq.³²

Peace operations present significant, often dangerous, challenges for military

forces. The level of consent of those involved in a peace agreement usually determines the level of force and impartiality required from the peace operations force. Loss of consent or impartiality may lead to an uncontrolled escalation of violence and change the nature of the operation.³³ Inherent dangers which can lead to the failure of the peace process include continued fighting, loss of impartiality on the part of the peace force, and the disruption of a settlement by a warring faction or third party. The presence of WMD in a region increases the virulence of these dangers.

Operation Provide Comfort sought to relieve tension between the Kurdish population and Iraq and allow the Kurds to move back to their homes located in Northern Iraq. Saddam Hussein employed chemical weapons against the Kurds three years earlier. However, Iraq's chemical and biological warfare threat posed little concern for forces involved in Operation Provide Comfort for two reasons. First, the Iraqi chemical and biological production machine had been dramatically reduced by the Persian Gulf War. Second, if actions in the Gulf War foreshadowed events in Provide Comfort, WMD would not be employed.

However, a realistic WMD scenario can be easily constructed by combining recent actions in Northern Iraq from 1988 and 1991. A humanitarian relief operation in the wake of a chemical attack on the Kurds would present significant challenges for peace operation forces. Conducting relief operations in or near a chemical hazard would test the abilities of both peace operation forces and the chemical assets tasked to support these operations.

The hypothetical threat posed in Northern Iraq varies somewhat from the reports that filtered out of Bosnia in 1993 that alleged the use of chemical weapons by both

warring factions. Where Iraqi use focuses on retribution, Bosnian Muslim (Bosniac) and Bosnian Serb use focuses on gaining tactical advantage.

Bosniac forces threatened on several occasions to use chlorine gas and allegedly used them against Bosnian Serb forces during the first week of August 1993. On August 1, 1993, the Bosniac Second Corps launched a major offensive in the Zvornik area toward the Drina River. The attack was stopped and the Bosnian Serbs counterattacked. Fighting continued until the UN organized a cease-fire on August 8. During the fighting around Boskovici, Bosniac forces allegedly used chlorine-filled mortar shells on three separate occasions. A Bosnian Serb officer described the weapons as 'crude' adding that the chlorine gas was effective at a radius of only 20 meters.³⁴

Reports based on these incidents from Washington were hazy at best. United States officials indicated that they had collected enough evidence that Bosnia was on the verge of chemical warfare during the summer to issue secret warnings to the warring parties. According to Marshal Harris, chief desk officer for Bosnia-Herzegovina at the time, the State Department learned that Bosniac commanders who lost ground to the Bosnian Serbs in the spring were threatening to strike back with chemical weapons. Meanwhile, United States officials in Bosnia-Herzegovina received 'credible evidence' that traces of chemical weapons had been detected in shell casings at Bosnian Serb artillery positions around Sarajevo. Harris said that Victor Jackovich, United States Ambassador to Bosnia-Herzegovina cautioned that such an attack would violate the 1925 Geneva Protocol. A similar warning was posed to the Bosnian Serb officials. According to United States officials, UN observers occasionally looked into claims of chemical weapon employment but no instances were ever documented.³⁵

Another problem existed in conjunction with the threat of WMD in the Balkans. The war in the Bosnia-Herzegovina had become the primary catalyst of the Islamic jihad in and against Western Europe. Bosniacs threatened to use terrorism if their demands for UN involvement were not met. In the summer of 1992, Tehran encouraged volunteer support from all over the Muslim world to assist their brothers in the Balkans. Support from the east in the form of manpower, weaponry, and finance posed a grave threat.³⁶

The known inherent dangers of peace operations coupled with the news reports out of Bosnia in 1993 provide fertile ground to develop what may be the future hazard in peace operations. It is quite possible that parties opposed to the peace process may employ WMD to thwart its development or to continue hostilities. For whatever the method or reason to employ WMD, the hazards produced are significant.

The three logical WMD hazard cases derived from the research to this point are the threat of WMD use, deliberate contamination, and collateral contamination. First, the threat of use serves to alarm potential adversaries and heighten awareness on internal NBC defense systems. Deliberate contamination focuses on a scenario where peace operations forces are either targeted or must deploy into a region and perform a peace mission in or near chemical contamination. Lastly, collateral contamination pertains to employment of WMD by a belligerent in the vicinity of a peace force.

Although no evidence exists that undeniably substantiates the use of WMD in the Bosnia-Herzegovina, the fact that chemical weapons were a serious concern presents additional considerations for future peace operations. To counter this new threat force in peace operations, emergency ordnance disposal and NBC defense operations may become requirements in many operations other than war.

As stated in FM 100-23, *Peace Operations*, engineer and chemical forces play an essential role to ensure a mobile and survivable force. Commanders must plan for chemical support if a viable threat exists. As noted earlier, that possibility is more often than not. The proper tailoring of forces is paramount to ensure the right mix of NBC defense assets are available to achieve mission requirements. NBC defense capabilities provide tactical commanders enhanced force protection to achieve mission accomplishment in these complex and potentially dangerous operations.

NBC Doctrine

As stated in FM 3-100, *Chemical Operations: Principles and Fundamentals*, the mission of the Chemical Corps is to “protect the force and allow the Army to fight and win under NBC conditions.” Missions include battle management, NBC defense, non-lethal operations, and smoke and obscurants. The bedrock of NBC defense is force protection. Force protection, one of the four pillars of combat power, affords the commander the ability to insure force preservation throughout the operation. Force protection is provided through the use of NBC decontamination, reconnaissance and smoke assets.³⁷

At the tactical level of war NBC defense and obscuration enhances the force’s ability to survive, fight and win under NBC conditions. NBC defense is established by achieving proficiency in three fundamental principles – avoid, protect, and restore.

Avoidance, the key to NBC defense, focuses on reducing the likelihood of being contaminated. Several techniques, tactics and procedures are applicable in accomplishing contamination avoidance. Avoidance takes two forms: active and passive. Active avoidance measures are taken specifically to avoid, control and lessen the effects of

WMD hazards. Active measures include contamination detection and identification, marking contaminated areas, the NBC warning and reporting system (NBCWRS), and control of contamination (bypassing contaminated areas, hardening or covering supplies, etc.). Passive avoidance measures, ingrained in units regardless of the threat, focus on the practice of sound military tactics. Passive measures include realistic NBC training, camouflage and concealment, hardened positions, and dispersion.

Under certain circumstances avoidance may be unlikely. A unit may become contaminated as a result of an NBC attack or that the unit to cross a contaminated area. Regardless of the reason, NBC protection provides the force a means to survive an attack and maintain operation tempo. NBC protection focuses on four areas: hardening positions and protecting personnel, assuming mission-oriented protective posture (MOPP), automatic masking, and reacting to attack. Hardening positions and protecting personnel includes actions that enhance a unit's resistance to the effects of an enemy attack. Assuming MOPP provides the commander a flexible means to use protective clothing and equipment that balances protection and performance degradation. Automatic masking and required reactions to attack include actions required by the command in the event that preconditions are satisfied (i.e. enemy artillery or rocket fire requires a unit to immediately mask).

Lastly, in the event that a unit becomes contaminated, restoration through decontamination stops the erosion of combat power and reduces potential casualties from further exposure or spread of contaminant. Several levels and degrees of decontamination exist. Each is designed to allow the commander maximum flexibility with regard to the mission, enemy, troops available, terrain and time (METT-T) and the

extent and type of contamination. In addition, terrain decontamination, although a huge logistical strain, remains an option to the tactical commander. Terrain decontamination may be necessary at key terrain such as transportation nodes, logistical areas, and displaced civilian facilities.³⁸

To bolster the effectiveness of the doctrinal principles, chemical units are employed to enhance combat power. Used at all levels from corps to brigade, a mix of decontamination, reconnaissance and smoke assets provide the tactical commander the flexibility and responsiveness to fight and win on a potentially contaminated battlefield.

In joint operations, the selected course of action supporting a campaign plan may include chemical units. The joint task force must take great care in assessing the possibility of a WMD active theater. Inclusion of NBC units and assets on the deployment schedule are a must if the threat exists.³⁹

United States forces must maintain the ability to not only survive an NBC attack, they must be trained and equipped to achieve their mission in any environment. On a battlefield where biological and chemical weapons exist, NBC defense affords the unit the capability to both survive and succeed. To provide adequate NBC defense, initial force packages must include chemical units to provide NBC reconnaissance, chemical and biological detection, large area smoke and decontamination.⁴⁰

The rise of peace operations as a primary mission for Army and other military forces poses a significant challenge. Current doctrine was written with a superpower adversary in mind. The post-cold War world presents a very different environment. Major General (Retired) Robert D. Orton, past commandant of the United States Army Chemical Corps stated in 1993 that, "US forces may encounter NBC weapons in

operations other than war. Peacemaking, humanitarian, shows of force and other operations all have the potential for encountering NBC weapons.”⁴¹ Chemical staffs and units must adequately support peace operations forces deployed in countries that possess WMD. Of course, the type and size of these units remains dependent on the situation; the threat should be countered with an equal or greater amount of NBC defense assets.

NBC defense doctrine has been singularly focused on a Soviet-type threat. As demonstrated by recent history the playing field has changed significantly. Also, access to high tech weapons and WMD is available to almost anyone. Chemical and biological defense must continue to expand from its basic principles in order to meet the global proliferation of WMD.⁴² Potential employment of WMD is almost unpredictable. We must continue to study the unlikely and assume the worst. The following case studies attempt to embody that spirit of thought.

Case Studies

A study of past operations proves beneficial to obtain a realistic view of peace operations and possible NBC defense requirements. Operation Provide Comfort (Northern Iraq 1991) and Operation Joint Endeavor (Bosnia-Herzegovina 1995) were selected based on the nature of the missions and existence of WMD in the region. The purpose of the case studies is to determine necessary NBC requirements as required by the operation. The circumstances identified in preceding chapters provide the conditions to examine the case studies.

The research indicated that WMD could be employed in three methods: against warring factions, against civilians, or against peace forces. The inherent dangers of peace operations provide the motive for WMD employment which include to continue the

fighting, force a peace force to lose impartiality, or to undermine or disrupt a settlement. The subsequent NBC hazards which peace forces could face involve the perceived threat of use, collateral contamination, deliberate contamination and industrial hazards.

For the purposes of this research a modified intelligence preparation of the battlefield (IPB) serves as the model for study to analyze threat capabilities in both case studies. Only portions of the IPB that pertain to WMD will be examined. The study model is comprised of four parts (IPB):

- 1) Environment
- 2) Battlefield effects
- 3) Evaluation of the threat
- 4) Determination of threat courses of action

Operation Provide Comfort

Operation Provide Comfort was the first case study examined and was selected based on past Iraqi chemical attacks against the Kurdish population. Humanitarian relief operations under the threat, or in the wake, of chemical attack present interesting challenges for the peace force.

Immediately following the Persian Gulf War, Kurdish resistance forces in Northern Iraq attempted to gain independence from Iraq. In response, Iraqi military forces, supposedly weak from the war, crushed the revolt in large scale attacks on Kurdish occupied areas in the north. With the massacre of 1988, still fresh in their memories which included chemical weapon use on civilians, the population fled the area and moved north into the mountainous region near the Turkish and Iranian border. Iraq continued its assault. Harsh conditions created unimaginable conditions for over 500,000

refugees. Turkey attempted to conduct relief operations in conjunction with nongovernmental organizations (NGOs) and private voluntary organizations (PVOs), but it was more than they could handle.

Under the recommendation of then Secretary of State Howard Baker, President Bush ordered commencement of Operation Provide Comfort on April 5, 1991. Saddam Hussein's continued and relentless pursuit of the Kurdish refugees posed a serious problem in the relief effort.⁴³ Continued aggression by a ruthless dictator, coupled with Iraq's potential of employing WMD, made Provide Comfort an extremely complex and potentially dangerous mission.

20,000 servicemen deployed from all reaches of the world in only two months to form a multinational force to conduct Provide Comfort. Eight infantry battalions from six different countries secured an area in Northern Iraq that allowed the Kurds to return to the area. Army engineers rebuilt the infrastructure while extensive medical support provided aid to the refugees. Aircraft from all four services participated in moving coalition forces and provided security. Overall, Operation Provide Comfort enjoyed magnificent success. However, the mission involved virtually no deliberate planning and preparation.⁴⁴ Any considerable effort by the Iraqis, conventional or unconventional, posed a serious threat to coalition forces and the Kurds. Iraq had used chemical weapons in the region only three years prior.

The threat forces facing the coalition never offered any serious resistance. The Iraqi army in the area consisted of three divisions, a force much larger than the coalition, but one that was no serious threat to the air power, mobilization and quality of the coalition. In addition to the conventional threat, several guerilla and terrorists groups

operated within the area of operations. Incidents involving both the Iraqis and the guerillas occurred but never ended in conflict. However, the armed presence of all groups opposing Kurdish return required vigilant focus on force protection measures by coalition forces.⁴⁵

The mission of the task force was to relieve the plight of the refugees. However, as the situation developed a security zone was required in northern Iraq to facilitate humanitarian assistance and support the stabilized refugee population. Once the zone was established it could be expanded to allow the refugee population to return to their homes and allow non-governmental and private volunteer organizations (NGO and PVO) to assume responsibility for the humanitarian tasks. However, the eventual stabilized and fragile conditions would require a credible presence for a period of time to sustain success.⁴⁶ Therefore, Provide Comfort required three objectives:

- 1) stop the dying and suffering and stabilize the population
- 2) re-settle the population in supportable and secure areas
- 3) return the population to their homes permanently

The tactical commanders' primary mission was the establishment, expansion and maintenance of a viable security zone. Due to the limited size and lack of heavy weapons of the security force, tactical reconnaissance capabilities were vital to the success of the security force. A highly responsive capability was needed when coalition and Iraqi forces confronted one another after initial entry and expansion of the security zone. The movement and disposition of Iraqi military forces were critical information requirements. Also, information on terrorists groups was vital to the mission.⁴⁷

Conventional tasks and missions proved to be extraordinarily challenging. The

added condition of WMD during Provide Comfort would have produced significant challenges for the relief operation force. To examine this 'hypothetical condition' Iraqi doctrinal employment of WMD must be analyzed.

The environment. Iraq is not a signatory of the Chemical Weapons Convention but ratified the Biological and Toxin Weapons Convention. Prior to the Gulf War Iraq possessed a wide variety of chemical warfare agents as well as several means of delivery.⁴⁸ At the initiation of Provide Comfort, Iraq had three divisions positioned in northern Iraq capable of disrupting ground operations in the region. The highlands in the northeast coupled with the climate and prevailing winds from April to June, although not optimal, supported the use of chemical weapons. Despite considerable damage from Coalition bombing during the Gulf War, Iraq likely maintained the capacity to deliver WMD via short-range ballistic missiles and artillery during Provide Comfort.⁴⁹ As evidenced by the Iran-Iraq War, Iraq maintained the capability to fight on a chemical battlefield and was willing to use WMD anywhere in the region against its Arab neighbors. As mentioned earlier, terrorist organizations were abundant in the region.

Battlefield effects. As mentioned above, the highlands in the northeast coupled with the climate and prevailing winds from April to June, although not optimal, supported the use of chemical weapons. Key terrain and possible WMD targets include Kurd settlement areas and roads leading into and out of these areas.

Evaluation of the threat. In 1991 Iraq appeared to be totally isolated, internationally. Iraqi employment of chemical weapons would have occurred early in the operation to inflict Kurdish casualties. Employment doctrine, as identified in the Iran-Iraq war, focused on contaminating key terrain and disrupting attacking forces to slow

operations tempo (OPTEMPO).⁵⁰ Delivery systems available for employment of WMD included short- range ballistic missiles and artillery.

Determination of threat course of action (COA). Determining the most likely threat COA is difficult given these circumstances. However, precedence directs attention to the Iraqi use of chemical weapons on Kurdish civilians. Therefore, the most likely target would have been Kurdish civilians exclusively, prior to the arrival of peace operation forces. Other possible COAs included contaminating key terrain (Kurd settlement areas and roads) and, although highly unlikely, the targeting of coalition forces.

NBC Defense Requirements from the Operation Provide Comfort Case Study

The case study provides ample opportunity to identify possible NBC doctrinal requirements as deemed necessary by a tactical commander. Given the possibility of WMD in the region, what would have been the tactical commander's requirements concerning NBC defense to survive and achieve mission accomplishment?

The most likely threat COA as determined by the modified IPB appears to be employment of WMD against Kurdish civilians exclusively, prior to the arrival of peace operation forces. Therefore, what specific requirements must be met from an NBC defense perspective to allow the commander to accomplish his humanitarian relief operation in the wake of a chemical attack?

To negate the effects of WMD in support of the tactical requirements would require support across the entire spectrum of NBC defense. Diligent planning and preparation with regard to NBC defense (avoid, protect and restore) would dramatically enhance protection of the force and achievement of the mission.

As implied in the doctrine, avoidance measures, both active and passive, can deny the enemy the opportunity to employ NBC weapons effectively. However, given the scenario the commander requires information about existing and potential contamination hazards in lieu of passive avoidance. The uniqueness of the humanitarian relief mission in the presence of chemical hazards does not afford the commander to take advantage of passive avoidance measures. Therefore, contamination detection and identification in this type of mission is critical to mission success. Once the contamination has been detected and identified, this information must be communicated to the command to prevent additional casualties.

Although complete avoidance of a chemical hazard is most desired, a unit may be required to enter a contaminated area or provide relief to those subjected to a chemical attack. Provided employment of WMD in theater against the Kurds, NBC protection would be paramount to the survivability of the force, refugees, civilians and the success of the mission. The degree and extent of contamination in theater would be difficult to predict. However, the inability of peace operations forces to manage the effects of an attack similar to that of 1988 could cause mission failure and create intolerable casualties. Active protection measures are required in this case for three reasons. First, the peace operations forces must maintain the ability to conduct operations in any environment without loss of life or operations tempo. Second, an overt display of NBC defense capabilities may preclude additional attacks. Third, the capability to provide NBC defense to refugees and civilians would bolster confidence in the operation and raise mission success probability.

Operating in or near a chemical hazard requires significant restoration support

from NBC defense assets. In addition to force requirements, refugee and civilian chemical casualty requirements must be supported. Immediate and thorough restoration of military and possible civilian casualties increases the commander's ability to achieve the mission and garner confidence among the civilian population.

Conducting a mission similar to Operation Provide Comfort in the wake of a chemical attack presents some significant challenges to both humanitarian relief forces and NBC defense assets. To achieve mission success and protect the force, a broad range of requirements specific to NBC defense are required to support this type of operation under these special conditions. As noted above, NBC defense support is not only limited to the military but to refugees and civilians as well.

Operation Joint Endeavor

Operation Joint Endeavor served as the second case study examined. It was selected based on alleged use of chemical weapons near peace operation forces in 1993. Also, several variables exist in Bosnia-Herzegovina that produce complex demands on peace operations forces. The added condition of WMD provides for an even more complex environment.

After four bloody and devastating years of conflict, the Former Warring Factions (FWF) signed the General Framework for Peace Agreement calling for an end to the Balkan conflict. The NATO-imposed cease-fire required NATO to deploy its first ground operation in its history and the largest in Europe since WWII. As part of NATO's Allied Command Europe, Rapid Reaction Corps, the US First Armored Division was ordered to Bosnia-Herzegovina as part of Operation Joint Endeavor. The division formed the nucleus of the "Multinational Division-North" or Task Force Eagle, one of three

divisions deployed as part of the Implementation Force (IFOR).

On December 20, 1995, the task force assumed responsibility of its area during a transfer of authority ceremony at Eagle Base, Tuzla. After bridging the Sava River on December 31, the 1st Armor Division was joined by the Nordic-Polish, Turkish and Russian brigades. In all, 12 nations supported the task force area. As a result of the General Framework for Peace Agreement, the task force received five primary tasks:

- 1) cessation of hostilities between FWF
- 2) ensure cooperation of FWF with IFOR within 30 days and formation of the zone of separation
- 3) ensure freedom of movement in Bosnia-Herzegovina
- 4) supervise the transition of control between elements of the FWF
- 5) monitor the status of forces throughout B-H.⁵¹

Task Force Eagle accomplished all its assigned missions by the deadline and conducted an enormously successful operation. It also supported the country's first democratic national elections. Eleven months from its initial deployment into the region, the 1st Armor Division transferred authority for command and control of Task Force Eagle to the 1st Infantry Division.⁵² Several factors contributed to the success enjoyed by 1st Armor Division with force protection appearing high on the list.

Brigadier General Stanley Cherrie, 1st Armor Division assistant division commander for maneuver, stated that "Paramount in everything we planned and accomplished was a concentration on force protection."⁵³ Force protection in peace operations extends well beyond the reaches of the tactical commander. It can influence both operational and strategic decisions. More importantly, it may even affect the will of

the citizens of the United States. Treatment of American servicemen in Somalia in 1993 will be forever stamped in the memories of most Americans, as was the use of chemical weapons against the Kurds in 1988.

Force protection is not only an element of combat power but is also the bedrock of NBC defense. Preparation by the task force with regard to NBC defense was noted as extensive and thorough at the time of transition to of authority to 1st Infantry Division.⁵⁴

Initially, intelligence assets suspected that Yugoslavia stockpiled numerous types of chemical weapons. They also believed Bosnia-Herzegovina maintained the capability to experiment with the manufacturing of chemical and biological weapons. This suspected capability created great concern. Supposedly, chemical weapons had been stored in Bosnia-Herzegovina and their whereabouts were unknown. The most dangerous threat course of action would have been Bosnian Serbs or Bosniacs using stolen chemical weapons on IFOR troops during the peace operation.⁵⁵ However, the United States Army Chemical School and Defense Intelligence Agency did not expect the FWF to use chemical weapons against IFOR troops.

However, as information arrived on the state of the environment in Bosnia-Herzegovina, task force leadership grew increasingly alarmed. Potential environmental hazards were collocated in troop lodgment areas.⁵⁶ The environmental hazards prevalent in Bosnia-Herzegovina required the support of chemical assets to manage potential consequences and identify hazards.

The known environmental chemical hazard proved to be a significant challenge for the task force, a challenge they professionally and competently accepted and executed. However, the threat or deliberate employment of WMD by the FWF or a

terrorist organization during Operation Joint Endeavor would have presented a completely different set of problems. For the purposes of this research, as with the research of Provide Comfort, an analysis of the threat through the use of a modified intelligence preparation of the battlefield (IPB) serves as the model for study.

Define the environment. Human Rights Watch (HRW) uncovered evidence that the Yugoslav National Army maintained an extensive and sophisticated chemical weapons program prior to the breakup of Yugoslavia in 1991. It is believed that the army of the Federal Republic of Yugoslavia inherited a great deal of that program. Also, reports indicate that the army of the Republic of Bosnia and Herzegovina produced crude chemical weapons during the conflict from 1992 to 1995 and possessed the weapons systems to deliver the munitions. HRW also found strong indications that the army of the Federal Republic of Yugoslavia continued to maintain an offensive chemical capability.⁵⁷ In addition to the conventional threat, the war in Bosnia had become the catalyst for the Islamic jihad in Western Europe by 1993. Terrorist involvement concerning WMD could pose significant challenges to the peace process. American involvement and disapproval of the general peace accords could serve as grounds for terrorist activity in the region to disrupt the peace process.

Battlefield effects. Yugoslavia's geography and terrain both support the use of chemical weapons. Potential WMD targets include FWF troop locations, key terrain, peace operation forces and civilians.

Evaluation of the threat. Alleged and threatened use of chemical weapons in 1993 appeared to focus on Bosniac perception of tactical defeat or in response to Bosnian Serb atrocities. Employment doctrine, as identified in the allegations of 1993, focused on

disrupting attacking forces to slow or deny success. However, a necessary pre-condition for introducing peace forces into the region required cessation of conflict by the FWF. WMD exchanges between the FWF should, therefore, be logically ruled out.

Determination of threat course of action. The most likely threat COA focused on Bosnian Serb action and Bosniac reaction given hostilities were ongoing. Perceived tactical defeat by the Muslims would set the conditions for use of chemical weapons. However, assuming hostilities would not resume as a result of FWF action, the existing threat of WMD in the region appears to center on third party intervention to disrupt the peace accord and deliberate or accidental industrial hazards. Therefore, likely WMD employment methods would have been third party attacks against targets that would force resumption of the fighting, force IFOR to lose its impartiality or disrupt the existing settlement.

NBC Defense Requirements from the Operation Joint Endeavor Case Study

The case study provides ample opportunity to identify possible NBC doctrinal requirements as deemed necessary by a tactical commander. Given the possibility of WMD in the region, what would have been the tactical commander's requirements concerning NBC defense to survive and achieve mission accomplishment?

Two overarching NBC defense requirements are produced from this case study. First, in an effort to dissuade third party intervention or threat of WMD use by an involved party, peace operation forces must exhibit NBC defense proficiency to the extent that employment of WMD is perceived untenable. Second, as a result of actual employment of WMD or an industrial hazard, peace operation forces must be able to continue the peace mission in the presence of a chemical hazard. To fail would mean the

loss of confidence by all factions and potential failure of the mission.

Accomplishment of the first requirement necessitates proficiency in all facets of NBC defense as perceived by the belligerent. Similar to Iraqi perceptions of Coalition forces in the Gulf War, peace forces must demonstrate NBC defense proficiency to the extent that WMD employment appears pointless to the belligerent.

In addition to its own NBC defense, peace forces must also be able to display the capability to handle specific NBC defense requirements from refugees and civilians if the host nation cannot support them. Support in terms of contamination location, NBC protection and decontamination/restoration operations would be required in the event a hazard exists.

The NBC defense requirements identified in the Provide Comfort case study for operating in a contaminated environment are very similar to those required in the Joint Endeavor case study. Differences will only be discussed.

As identified in the Provide Comfort case study, active avoidance measures are required in this case study to provide the commander information about existing and potential contamination hazards. Once the contamination has been detected and identified, this information must be communicated to the entire command and affected civilians and refugees to prevent additional casualties and the spread of contamination. Unique to Joint Endeavor is the requirement to communicate this information to not only joint forces but multinational, as well. Also, in an effort not to lose impartiality, this critical information must be passed to the FWF, civilians and refugees.

Regardless of the target, peace forces must be able to operate in an NBC environment. As mentioned earlier, failure to do so would degrade their ability to

achieve mission success. Assuming employment of WMD in the area of operations, NBC protection would be paramount to the survivability of the force, refugees, civilians and the success of the mission.

Given the consequences of conducting a mission in a NBC environment, contamination of peace operations troops and civilians would require the use of restoration capabilities. Immediate and thorough restoration of military and possible civilian casualties increases the commander's ability to achieve the mission and garner confidence among the civilian population.

Conducting a mission similar to Operation Provide Comfort in the wake of a chemical attack presents some significant challenges to both humanitarian relief forces and NBC defense assets. To achieve mission success and protect the force, a broad range of requirements specific to NBC defense are required to support this type of operation under these special conditions. As noted above, NBC defense support is not only limited to the military but to refugees and civilians, as well.

Analysis: NBC Defense Doctrine and Peace Operations Requirements

The case studies illustrated the proliferation of weapons of mass destruction and the emergence of operations other than war as primary concerns for the United States Army. As we reach the beginning of the new millennium the possibility of conducting peace operations in a WMD environment are an increasing possibility. To answer the research question this study examined the doctrinal functions of NBC defense and obscuration, developed to satisfy the warfighting requirements of the commander. An analysis of two case studies focused on the tactical commander's requirements with regard to conducting successful peace operations in a WMD environment. Now, given

force protection and mission accomplishment as evaluation criteria, are NBC defense doctrinal functions applicable in peace operations?

Evaluation Criteria

First, evaluation criteria must be defined and quantified. Mission accomplishment and force protection serve as criteria to evaluate the suitability of current doctrine as it applies or fails to apply to peace operations.

Defining mission accomplishment, or success, in peace operations is often difficult. The dynamic diplomatic environment driving the peace process often requires commanders to re-define tactical missions in order to support achievement of the desired political end-state. However, for the tactical commander success is defined as the accomplishment of assigned tactical tasks in support of the overall peace operation process. Commanders judge success based on the achievement of these specific tactical missions which support the desired diplomatic conditions and achievement of end-state. Success is defined by the tactical commander early in the planning process and is continually re-defined throughout the operation. Lastly, peace operation success for the tactical commander results in the absence or diminishment of violence.⁵⁸

Force protection has been and always will be a priority for all commanders responsible for conducting peace operations. Regardless of the specific threat, force protection remains paramount in peace operations. As Brigadier General Cherrie stated regarding Operation Joint Endeavor, force protection is 'paramount' in everything we do concerning peace operations.

Simply, force protection consists of accomplishing the mission with a minimal loss of personnel, equipment and supplies.⁵⁹ Force protection includes NBC defense

operations. NBC defense facilitates achievement of the mission with minimum casualties. A unit trained and ready to conduct its assigned mission in an NBC environment enhances its ability to achieve mission success.

Doctrine Analysis

Given the NBC defense requirements identified in the case studies and the qualification of the evaluation criteria, the research question can now be satisfactorily addressed. Are NBC defense doctrinal functions of avoid, protect and restore applicable in peace operations? Specifically, does the doctrine satisfy the requirements of the tactical commander?

Avoidance

Both case studies identified a general requirement for contamination avoidance. In the Provide Comfort case study information was required about existing and potential contamination hazards. The uniqueness of the humanitarian relief mission in the presence of chemical hazards did not afford the commander to take advantage of passive avoidance measures. Therefore, contamination detection and identification in this type of mission would be critical to mission success and protection of the force. Once the contamination was detected and identified, this information would have to be communicated to the entire task force and all affected civilians and refugees to prevent additional casualties and the spread of contamination. Active avoidance measures were also required in the Joint Endeavor case study. However, unique to Joint Endeavor was the requirement to actively detect and identify possible NBC hazards caused by industrial chemical complexes near IFOR troops. Existing doctrine supports the detection and identification requirements generated from both case studies in accordance with the

evaluation criteria.⁶⁰ However, communication procedures via the NBC warning and reporting system require further analysis.

Although systems are in place that facilitates the flow of this critical information within the military, no doctrine exists outlining the method of dissemination to civilians and refugees in potential hazard areas. This is critical in order to limit the spread of contamination and loss of life. Failure to inform indigenous people and other civilians could threaten the mission success by losing the confidence of the population in the peace forces. Use of information channels established within existing joint military commissions could facilitate the passage of this information to the affected civilian population.

Communication of this vital information to multi-national forces also presents a significant challenge. The majority of peace operations consist of forces from several different countries speaking several different languages. Failure to disseminate this time sensitive information both undermines force protection capabilities of forces involved and threatens achievement of the mission. To remedy this challenge the task force commander must establish procedures early in the operation to ensure adequate flow of information.⁶¹

The last requirement concerning avoidance is common to both case studies. In an effort to prevent third party intervention or threat of WMD use, peace operation forces must exhibit NBC defense proficiency to the extent that employment of WMD is perceived senseless. To accomplish this requirement demands perceived proficiency in all facets of NBC defense by the belligerent. Iraqi perceptions of Coalition forces in the Gulf War contributed to the lack of WMD employment in theater because employment

presented a “no win” situation to the Iraqis.⁶² In addition to its own NBC defense, peace forces must also be able to display the same “perceived” capability to manage the specific NBC defense requirements from refugees and civilians if the host nation cannot support them. There are no doctrinal functions that specifically pertain to this general requirement. Success or failure is a function of training and leadership prior to arrival in the area of operations.

Protection

The NBC defense function of protection is a requirement found in both case studies. Provided employment of WMD or the existence of an industrial hazard in the area of operations, NBC protection would be paramount to the survivability of the military force, refugees, civilians and the success of the mission. Regardless of the target, peace forces must be able to operate in an NBC environment.

In both case studies existing doctrine is applicable to peace operations and satisfies the evaluation criteria for military forces. Regardless of individual or collective proficiency, the existing NBC defense doctrine for protection is more than adequate to enable the force to survive, fight and win under NBC conditions.⁶³ However, shortfalls exist with respect to civilian and refugee requirements.

The Provide Comfort case study was rooted in the requirement to provide humanitarian relief operations in the wake of a chemical attack on the Kurds. An inherent requirement of such an operation would be the protection of civilians supporting the relief effort and refugees in and around existing hazards. Current doctrine exists, Joint Pub 3-11, *Joint Doctrine for NBC Defense*, to guide protection measures for United States civilian personnel in an affected region. However, a doctrinal gap exists in

reference to protection of non-US civilians and refugees located in a United States military area of operation unable to provide for their own support. In addition to a doctrinal gap, the means to support such a requirement may exceed logistic support capability. Whatever the reason, failure to provide sufficient NBC defense protection to surviving indigenous personnel would severely hinder overall force protection and threaten successful completion of the mission.

Mitigating factors or possible solutions to this problem requires real innovation and commitment of resources, predicated on the threat. Task force commanders must identify the need to provide this capability early in the planning process and request support immediately. Support from multi-national forces both in manpower and logistics may satisfy these requirements. Also, the national command authority could task domestic response assets to provide assistance outside the continental United States. However, expertise is in great abundance, shortfalls exist in manpower and logistics.

Restoration

Restoration support in the form of decontamination was a requirement identified in both case studies. As noted in FM 3-5, NBC Decontamination, the primary purpose of decontamination is to stop the erosion of combat power and reduce casualties.⁶⁴

Operating in or near a chemical hazard requires significant restoration support for military forces from NBC defense assets. Complete restoration of combat power is extremely resource intensive.⁶⁵ In the Provide Comfort case study forces would be required to conduct the humanitarian relief mission in and around a chemically contaminated area. Eventually, complete restoration of combat power would be required. NBC decontamination doctrine is adequately designed to support this mission and

satisfies the evaluation criteria.

Although the origin of the contamination is different, the Joint Endeavor case study ultimately requires the same type of restoration support for peace forces. Regardless of contamination caused by third party employment or an industrial chemical hazard, peace force combat power requires restoration by means of decontamination. However, in addition to force requirements, refugee and civilian chemical casualty requirements may have to be supported.

Similar to the challenges posed in providing NBC protection support to civilians and refugees, restoration support is equally difficult. First, it must be understood that the ability to provide restoration support to civilian casualties increases the commander's ability to achieve mission success and garner confidence among the civilian population. Failure to do so could only have negative effects. Again, doctrine does not exist that outlines how to support restoration of civilian and refugee casualties when host nation support is lacking.

Developing a solution to fill this specific doctrinal void is difficult. First, the extent of the contamination and number of casualties will determine the amount of support required. Second, if the operation is a multinational effort and requires significant logistic support, assistance may be required from all countries involved. Assets would have to be stockpiled to multiply the effectiveness of the overall effort.⁶⁶ Finally, a headquarters must be assigned to coordinate the restoration effort.

Based on the requirements derived from the case studies and using force protection and mission accomplishment as evaluation criteria, doctrinal gaps exist in NBC defense doctrine regarding peace operations. The existing doctrine fails support

potential civilian/refugee requirements incurred during the conduct of peace operations in a NBC environment. This void could diminish the peace operation force's ability to obtain and/or maintain the consent of the warring parties and, specifically, the local population. An operation that lacks the capability to respond effectively to challenges in the operational environment may lose the consent of the population, because they fear they cannot be protected.⁶⁷ If this came to fruition, mission accomplishment would be virtually impossible for the peace force. The harsh reality exists that while survival of peace forces in an NBC environment is a requisite for mission success, preventable civilian casualties will ensure mission failure.

Conclusion

Peace operations present United States military forces significant tactical and operational challenges. Participation in recent peace operations in Northern Iraq, the Balkans, Somalia, and Haiti appear to illustrate the nation's commitment to involvement.

With the continued proliferation of weapons of mass destruction the probability that peace operations forces may have to deal with WMD hazards appears to be increasing. Nations known to possess WMD capabilities such as Iraq, Iran, Libya, Syria and North Korea, as well as non-state/sub-national groups, present a significant threat to America's view of world stability even without WMD. While America and its Western allies enjoy stability, four billion poor people around the globe demand change.⁶⁸ The complexity presented to the military by peace operations is enormous. The additions of a WMD threat increase the complexity of the mission tremendously.⁶⁹

Two events in the last 10 years appeared to foreshadow this new challenge in conducting peace operations. First, on March 17, 1988, Iraq attacked the Kurdish village

of Halabja with a variety of chemical weapons including cyanide gas and suspected nerve agents against the civilian population killing hundreds of refugees. Second, in the presence of UNPROFOR, Bosniacs allegedly used chlorine mortar shells on three separate occasions from August 1 to 8, 1993, during hostilities with Bosnian Serbs. The significance of these two events illustrate the potential for employment of WMD and that it can appear in various forms and occur throughout the spectrum of military missions, to include peace operations.

NBC defense operations are requirements in many operations in war; however, these functions may now apply in peace operations. Proper tailoring of forces that include NBC defense assets can provide the tactical commander enhanced force protection and increased capability to achieve mission success in these complex and potentially dangerous operations.⁷⁰

While the research indicated that current NBC defense doctrine applied to military force requirements of peace operations, it failed to address additional requirements directly linked to mission success. Specifically, the existing doctrine fails to support potential civilian/refugee requirements incurred during the conduct of peace operations in a NBC environment. Lack of applicability in avoidance, protection and restoration all contributed to the doctrinal shortfall. Failure to satisfy these requirements could jeopardize the peace process and negate mission accomplishment.

However, as with most large-scale military operations, ranging from World War II to the Gulf War, a coalition/multinational approach is the azimuth of success. Successful peace operations in the recent past have been multinational in composition. That same approach on a larger scale may satisfy the requirements identified to support

refugees and civilians entangled in a peace operation involving a NBC hazard.

As the United States moves into the next millennium maintenance of world order and stability will require peace operations on a rather regular basis. The United States, the reigning world superpower, will probably absorb the brunt of these missions. The maintenance of stability through peace operations may be a potential adversary's interpretation of an act of war. As United States forces deployed to regions of discontent they must be prepared for the very worst, ready to execute the mission efficiently and professionally. In theory, a robust NBC defense capability may deny an adversary the ability to achieve their objectives and ultimately deter the use of WMD in any form.⁷¹ The United States cannot afford to disregard the possibility of WMD use in peace operations. Implementation of existing NBC defense doctrine coupled with the innovative commitment of resources will insure success of future peace operations in an NBC environment.

¹ Charles E. Heller, *Chemical Warfare in World War I: The American Experience, 1917-1918*, Leavenworth Paper 10, Leavenworth: Combat Studies Institute, 1984, 91.

² John P. Sinnott, "It was the Algerian and Canadian soldiers at Ypres who suffered history's first major poison gas attack," *Military History*, April 1994, 12.

³ Bernard and Fawn M. Brodie, *From Crossbow to H-bomb* (Bloomington: Indiana University Press, 1973), 15-16.

⁴ Sinnott, 12.

⁵ Yossef Bodansky, "Bosnian Muslim Forces' First Combat Use of Chemical Weapons: The Precedence Is Set," *Defense & Foreign Affairs Strategic Policy*, August 31, 1993, 16.

⁶ The White House. *A National Security Strategy for a New Century*. May 1997, 11-12.

⁷ John Giles, *Flanders Then and Now; the Ypres Salient and Paschendale* (London: Plaistow Press Ltd, 1987), 59.

⁸ Brodie and Brodie, 195.

⁹ James Kendall, *Breathe Freely! The Truth About Poison Gas*, (London: G. Bell & Sons Ltd., 1938), 47.

¹⁰ Valerie Adams, *Chemical Warfare, Chemical Disarmament* (Bloomington: Indiana University Press, 1990), 16-17.

¹¹ Frederick J. Vogel, *The Chemical Weapons Convention: Strategic Implications for the United States* (Carlisle Barracks, PA: Strategic Studies Institute, US Army War College, 1997), 2.

¹² Adams, 65-66.

¹³ Ibid, 69.

¹⁴ Vogel, 2.

¹⁵ "Organization for the Prohibition of Chemical Weapons," in The Chemical Weapons Convention Home Page; available from <http://www.opcw.nl/guide.htm> ; Internet; accessed 27 October 1998, 6 of 21. On January 13, 1993, 130 countries signed the Chemical Weapons Convention (CWC) to prohibit and eliminate all types of weapons of mass destruction. The convention recalls the Geneva Protocol of 1925 and the Biological Weapons Convention of 1972. As of August 31, 1998, 169 countries were signatories.

¹⁶ Vogel, 3.

¹⁷ Department of Defense, *Conduct of the Persian Gulf War, Final Report to Congress*, April 1992, 640.

¹⁸ Ibid, 645.

¹⁹ William Cohen, "A Conversation with William Cohen," interview by Barbara Starr and Stacey Evers, *Jane's Defence Weekly*, (13 August 1997), 32.

²⁰ Tim Otter, "NBC Defense in a Changing World," *Military Technology*, vol. XX, issue 12, 1996, 35.

²¹ Robert C. Neumann, LTC, "Chemical Warfare Threat and the Chemical Weapons Convention," *Army Chemical Review*, July 1998, 7.

²² Ibid, 8.

²³ Ralph G. Wooten, MG, "Chemical Corps and NBC Operations Future," *Military Review*, September-October 1996, 75-76.

²⁴ Robert G. Joseph, "Impact of NBC Proliferation on Doctrine and Operations," *Joint Force Quarterly*, Autumn 1996, 80.

-
- ²⁵ Department of Defense, *Proliferation: Threat and Response*, November 1997, iii.
- ²⁶ The White House, *A National Security Strategy for a New Century*, May 1997, 12.
- ²⁷ Richard A. Jackson, COL, "Nuclear, Chemical, and Biological Defense in the 21st Century," Center for Strategic Leadership, US Army War College, 1996, 5.
- ²⁸ US Army, *Field Manual 100-23, Peace Operations*, (Washington DC: Department of the Army, 31 May 1994), iv.
- ²⁹ *Ibid*, iv-v.
- ³⁰ FM 100-23, 111. Peace operations are defined as an umbrella term that encompass three types of activities: support to diplomacy (peacemaking, peace building, and preventative diplomacy) and two complimentary, predominantly military activities, peacekeeping and peace-enforcement.
- ³¹ US Army, *Field Manual 100-20, Stability and Support Operations, Final Draft*, (Washington DC: Department of the Army, 25 September 1995), 5-28 – 5-29.
- ³² Togo D. West and Dennis J. Reimer, GEN, "A Statement on the Posture of the United States Army FY 98," February 1997, 8.
- ³³ *Field Manual 100-20*, 13.
- ³⁴ Bodansky, 16.
- ³⁵ Andrew Alexander and Bob Deans, "Did US Head Off Chemical War in Bosnia? Fears of Illegal Attacks May Have Led to Warning," *The Atlanta Journal and Constitution*, 30 November 1993.
- ³⁶ Yossef Bodansky, "Iranian and Bosnian Leaders Embark on a New, Major Escalation of Terrorism Against the West," *Defense & Foreign Affairs Strategic Policy*, August 31, 1993, 7.
- ³⁷ US Army, *Field Manual 3-100, Chemical Operations*, (Washington DC: Department of the Army, 8 May 1996), 1-5 – 1-6.
- ³⁸ *Ibid*, 4-1 – 4-10.
- ³⁹ The Joint Staff, Joint Pub 3-11, *Joint Doctrine for Nuclear, Biological, and Chemical (NBC) Defense*, 10 July 1995, III-4 & III-8.
- ⁴⁰ Robert D. Orton, MG (Ret.), "The Impact of WMD on Battlefield Operations," *Military Review*, vol. 73, no. 12, December 1993, 69-70.
- ⁴¹ *Ibid*, 72.

⁴² Rick Shipkowski, LTC, "The Challenge of CB Defense in a High-Tech Army," *Army Chemical Review*, July 1998, 37.

⁴³ US European Command, *Operation Provide Comfort, After Action Report-USCINEUR*, 29 Jan 1992, 22.

⁴⁴ Gordon W. Rudd, LTC, *Operation Provide Comfort-One More Tile on the Mosaic, Lessons Learned and Observations, Final Draft*, Department of Evaluations & Standardization, US Army JFK Special Warfare Center & School, Fort Bragg, North Carolina, 239-240.

⁴⁵ *Operation Provide Comfort, After Action Report-USCINEUR*, 7.

⁴⁶ *Ibid*, 4.

⁴⁷ *Ibid*, 12.

⁴⁸ Department of Defense, *Proliferation: Threat and Response*, 31.

⁴⁹ *Ibid*, 30.

⁵⁰ Vogel, 3.

⁵¹ Center for Army Lessons Learned, *Operation Joint Endeavor, Task Force Eagle Initial Operations*, Fort Leavenworth, KS, May 1996, ix.

⁵² US Army, "History of Task Force Eagle," in Task Force Eagle Home Page; available from <http://www.tfeagle.army.mil> ; Internet; accessed 29 October 1998.

⁵³ Stanley F. Cherrie, BG, "Task Force Eagle," *Military Review*, July-August 1997, 65.

⁵⁴ Robert J. Launstein, LTC and Randal J. Schlosser, SGM, "Operation Joint Endeavor-Chemical Training and Preparation," *Army Chemical Review*, July 1996, 12.

⁵⁵ John W. Miller, CPT, Thomas Baron, SFC, and Tharon Cook, SPC, "The Chemical Corps and the Environment in Bosnia-Herzegovina," *Army Chemical Review*, July 1996, 3-4.

⁵⁶ *Ibid*, 3.

⁵⁷ Human Rights Watch, *Clouds of War*, Human Rights Watch Report 1998, March 1998 [report on-line]; available from <http://www.hrw.org/hrw/pubweb/webcat-113.htm> ; Internet; accessed 30 October 1998;

⁵⁸ FM 100-20, 5-29.

⁵⁹ FM 100-23, 36.

⁶⁰ US Army, *Field Manual 3-19, NBC Reconnaissance*, (Washington DC: Department of the Army, 19 November 1993), ii. This manual applies to any unit that has the primary or implied mission of performing NBC reconnaissance.

⁶¹ JP 3-11, III-9.

⁶² Department of Defense, *Conduct of the Persian Gulf War, Final Report to Congress*, April 1992, 645.

⁶³ FM 3-100, 4-0.

⁶⁴ US Army, *Field Manual 3-5, NBC Decontamination*, (Washington DC: Department of the Army, 17 November 1993), iii.

⁶⁵ FM 3-100, 4-9.

⁶⁶ JP 3-11, IV-7.

⁶⁷ Christine M. Cervenak, "Lessons of the Past: Experiences in Peace Operations," in *Peace Operations: Developing an American Strategy*, ed. Antonia Handler Chayes and George T. Raach (Washington, DC: National Defense University Press, 1995), 41.

⁶⁸ Daniel P. Bolger, COL, *Savage Peace*, (Novato, CA: Presidio Press, 1995), p. 49.

⁶⁹ M. Mitchell Waldrop, *Complexity*, (New York: Simon & Schuster, 1993), p. 333.

⁷⁰ Orton, 70.

⁷¹ Robert G. Joseph and John F. Reichart, "Deterrence and Defense in a Nuclear, Biological and Chemical Environment," Center for Counterproliferation Research, National Defense University, 1996, 22.

BIBLIOGRAPHY

- Adams, Valerie. *Chemical Warfare, Chemical Disarmament*. Bloomington: Indiana University Press, 1990.
- Agence France Presse. General Ratko Mladic Accuses Moslems of Making Chemical Weapons. *Tanjug News Agency*, 1 December 1993.
- Alexander, Andrew and Bob Deans. Did US Head Off Chemical War in Bosnia? Fears of Illegal Attacks May Have Led to Warning. *The Atlanta Journal and Constitution*, 30 November 1993.
- Bailey, Don W., MAJ. *Poisonous Gas and the American Expeditionary Forces In World War I: Is It Still 1918*. SAMS Monograph, US Army Command and General Staff College, 1992.
- Bodansky, Yossef. "Bosnian Muslim Forces' First Combat Use of chemical Weapons: the Precedence Is Set." *Defense & Foreign Affairs Strategic Policy*, August 31, 1993.
- Bodansky, Yossef. "Iranian and Bosnian Leaders Embark on a New, Major Escalation of Terrorism Against the West." *Defense & Foreign Affairs Strategic Policy*, August 31, 1993.
- Bolger, Daniel P., COL. *Savage Peace*. Novato, CA: Presidio Press, 1995.
- Brodie, Bernard and Fawn M. Brodie. *From Crossbow to H-Bomb*. Bloomington: Indiana University Press, 1973.
- Center for Army Lessons Learned. Chemical Named Areas of Interest in CALLCOMS data base. [data base on-line] Ft Leavenworth, KS: 1996, accessed 28 September 1998. record no. 10002-1703.
- Center for Army Lessons Learned. NBC Survey Techniques/Equipment for Industrial/Agricultural in CALLCOMS data base. [data base on-line] Ft Leavenworth, KS:, 1996, accessed 28 September 1998 record no. 10002-3345.
- Center for Army Lessons Learned. Sudsao Chemcial Production Facility, Taszar in CALLCOMS data base. [data base on-line] Ft Leavenworth, KS:, 1996, accessed 28 September 1998. record no. 10001-9836.
- Center for Army Lessons Learned. Chemical Named Area of Interest in CALLCOMS data base [data base on-line] Ft Leavenworth, KS:, 1996. accessed 28 September 1998. record no. 10002-1703.
- Center for Army Lessons Learned. NBC Survey Techniques/Equipment for

- Industrial/Agricultural in CALLCOMS data base [data base on-line] Ft Leavenworth, KS:, 1996. accessed 28 September 1998. record no. 10002-3345.
- Center for Army Lessons Learned. *Operation Joint Endeavor, Task Force Eagle Initial Operations*. Fort Leavenworth, KS, May 1996.
- Chayes, Antonia Handler and George T. Raach. *Peace Operations: Developing an American Strategy*. Washington, DC: National Defense University, 1995.
- Cherrie, BG Stanley F. Task Force Eagle. *Military Review*. July-August 1997.
- Cohen, William. "A Conversation with William Cohen," interview by Barbara Starr and Stacey Evers. *Jane's Defence Weekly*, 13 August 1997.
- Department of Defense, *Conduct of the Persian Gulf War, Final Report to Congress*. April 1992.
- Department of Defense, *Proliferation: Threat and Response*. November 1997.
- Giles, John. *Flanders Then and Now; the Ypres Salient and Paschendaele*. London: Plaistow Press Ltd, 1987.
- Heller, Charles E. *Chemical Warfare in World War I: The American Experience, 1917-1918*, Leavenworth Paper 10, Leavenworth: Combat Studies Institute, 1984.
- Human Rights Watch. *Clouds of War*. Featured Books, Federal Republic of Yugoslavia. accessed 30 October 1998; available from Internet.
- Hunter, Jonathan B., MAJ. *The Doctrinal Functions of Intelligence: Are They Applicable to Peacekeeping and Peace Enforcement Operations?* SAMS Monograph, US Army Command and General Staff College, 1993.
- Jackson, Richard A., COL. *Nuclear, Chemical, and Biological Defense in the 21st Century*. Center for Strategic Leadership, US Army War College, 1996.
- Kellar, Charles S., MAJ. *The Roles and Functions of Fire Support in Peace Operations*. SAMS Monograph, US Army Command and General Staff College, 1994.
- The Joint Staff. Joint Pub 3-11, *Joint Doctrine for Nuclear, Biological, and Chemical (NBC) Defense*, 10 July 1995.
- Joint Warfighting Center. *Joint Task Force Commander's Handbook for Peace Operations*. Fort Monroe, VA, 1997.
- Joseph, Robert G. "Impact of NBC Proliferation on Doctrine and Operations," *Joint Force Quarterly*, Autumn 1996.

- Joseph, Robert G. and John F. Reichart. *Deterrence and Defense in a Nuclear, Biological and Chemical Environment*. Center for Counterproliferation Research, National Defense University, 1996.
- Kendall, James. *Breathe Freely! The Truth About Poison Gas*. London: G. Bell & Sons Ltd., 1938.
- Launstein, Robert J., LTC, and SGM Randal J. Schlosser. Operation Joint Endeavor-Chemical Training and Preparation. *Army Chemical Review*. July 1996.
- Miller, John W., CPT, SFC Thomas Baron, and SPC Tharon Cook. The Chemical Corps and the Environment in Bosnia-Herzegovina. *Army Chemical Review*. July 1996.
- Neumann, Robert C., LTC. "Chemical Warfare Threat and the Chemical Weapons Convention," *Army Chemical Review*, July 1998.
- Orton, Robert D. MG (Ret.). The Impact of WMD on Battlefield Operations. *Military Review*, vol. 73, no. 12, December 1993.
- Otter, Tim. "NBC Defense in a Changing World," *Military Technology*, vol XX, issue 12, 1996.
- Radio Bosnia-Herzegovina, Sarajevo. Planned Use of Chemical Weapons by the B-H Second Corps. *BBC Summary of World Broadcasts*, 29 July 1993.
- Rudd, Gordon W., LTC. *Operation Provide Comfort-One More Tile on the Mosaic, Lessons Learned and Observations, Final Draft*. Department of Evaluations & Standardization, US Army JFK Special Warfare Center & School, Fort Bragg, North Carolina.
- Shipkowski, Rick., LTC. The Challenge of CB Defense in a High-Tech Army. *Army Chemical Review*, July 1998.
- Sinnott, John P. "It was the Algerian and Canadian soldiers at Ypres who suffered history's first major poison gas attack." *Military History*, April 1994.
- The White House. *A National Security Strategy for a New Century*. May 1997.
- United Nations, UN Says Non-lethal Gas Shells Fired in Sarajevo. *Reuters*, 28 July 1993.
- US Army. *Field Manual 3-3, Chemical and Biological Contamination Avoidance*. Washington DC: Department of the Army, 16 November 1992.
- US Army. *Field Manual 3-4, NBC Protection*. Washington DC: Department of the Army,

29 May 1992.

US Army. *Field Manual 3-5, NBC Decontamination*. Washington DC: Department of the Army, 27 June 1994.

US Army. *Field Manual 3-7, NBC Field Handbook*. Washington DC: Department of the Army, 29 September 1994.

US Army. *Field Manual 3-19, NBC Reconnaissance*. Washington DC: Department of the Army, 19 November 1993.

US Army. *Field Manual 3-100, Chemical Operations*. Washington DC: Department of the Army, 8 May 1996.

US Army. *Field Manual 100-5, Operations, Revised Final Draft*. Washington DC: Department of the Army, 6 April 1998.

US Army. *Field Manual 100-20, Stability and Support Operations, Final Draft*. Washington DC: Department of the Army, 25 September 1995.

US Army. *Field Manual 100-23, Peace Operations*. Washington DC: Department of the Army, 31 May 1994.

US European Command. *Operation Provide Comfort, After Action Report-USCINEUR*. 29 Jan 1992.

US Army, History of Task Force Eagle, accessed 29 October 1998; available from <http://www.tfeagle.army.mil> ; Internet.

Vogel, Frederick J. *The Chemical Weapons Convention: Strategic Implications for the United States*. Carlisle Barracks, PA: Strategic Studies Institute, US Army War College, 1997.

Waldrop, M. Mitchell. *Complexity*. New York: Simon & Schuster, 1993.

West, Togo D. and GEN Dennis J. Reimer. *A Statement on the Posture of the United States Army FY 98*. February 1997.

Wilcox, David, MAJ. *Chemical Corps: Break Glass in Case of War*. SAMS Monograph, US Army Command and General Staff College, 1992.

Wooten, Ralph G., MG. Chemical Corps and NBC Operations Future. *Military Review*, September-October 1996.

Zapata, David, SFC. Environmental Reconnaissance-an Old Mission with a New Twist. *Army Chemical Review*, July 1996.